

Al(NO<sub>3</sub>)<sub>3</sub>. After impregnation, the support is air dried and heated slowly to 600° and held at that temp. for 1 hr. Catalysts made from these supports are esp. useful in treating exhaust gas from internal combustion engines. D. F. Doonan

84: 80379c Silver catalyst for use in preparing ethylene oxide. Nielsen, Robert P.; La Rochelle, John H. (Shell Internationale Research Maatschappij B. V.) Ger. Offen. 2,521,906 (Cl. B01J, C07D), 04 Dec 1975, US Appl. 471,398, 20 May 1974; 26 pp. For a Ag catalyst with the best selectivity for the oxidn. of C<sub>2</sub>H<sub>4</sub> to ethylene oxide, the amt. of alkali metal cation introduced simultaneously with Ag onto the porous, heat-stable support is related directly to the sp. surface of the support. For example, com.  $\alpha$ -Al<sub>2</sub>O<sub>3</sub> (alundum) was impregnated with an aq. soln. contg. Ag<sub>2</sub>(en)<sub>2</sub>CrO<sub>4</sub> and a controlled amt. of Rb. The excess liq. was removed by heating at 290°, the catalyst was dried, and the Ag salt was reduced to give a catalyst contg. 10.4 wt.% metallic Ag and 0.0013 wt.% Rb. The selectivity of the catalyst for ethylene oxide was 72.5%.

84: 80380w Ruthenium-containing catalyst product. Gandhi, Haren S.; Shelef, Mordecai; Strow, Theodore F. (Ford-Werke A.-G.) Ger. Offen. 2,526,385 (Cl. B01J), 18 Dec 1975, US Appl. 479,725, 17 Jun 1974; 9 pp. A highly-dispersed catalyst product consists of a Ru-contg. material for the catalytic redn. of N oxides and a protective material effective under oxidizing conditions which interacts with the active material to form a nonoxidizable, nonvolatile stable compd. Both materials are deposited on the support from acidic soln. The protective material is an alk. earth compd. and (or) a rare earth compd. Initially, the support of hydrated Al<sub>2</sub>O<sub>3</sub> is coated with BaO as an undercoating by satg. the support with a Ba salt soln. and heating the satd. support at 700-800°. The coated support is treated with a soln. contg. equimolar quantities of BaCrO<sub>4</sub> and Ru(OH)<sub>3</sub> so the support will have fixed on its surface 650 ppm Ru. After the deposition, the support was exposed to a H reducing atm. at 400-50° for 4 hr and then at 800-1000° for <6 hr.

84: 80381x Shaped plastics with wettable or catalyzing surfaces. Bialecki, Zbigniew (Ośrodek Badawczo-Rozwojowy Przemysłu Budowy Urządzeń Chemicznych "CEBEA") Pol. 74,436 (Cl. B01J), 30 Apr 1975, Appl. 152,230, 17 Dec 1971; 2 pp. Shapes, esp. packing elements, made of poorly wettable plastics (PVC, ABS, polyolefins) were activated with solvents and covered with chem. resistant, wettable or catalyzing powd. materials (20-100  $\mu$ ) in a fluidized bed at the temp. higher by 100-150° than m.p. of the plastics. W. Pasiuk

84: 80382y Catalyst for the manufacture of formaldehyde by oxidation of methanol. Zidek, Rudolf; Hajek, Jaroslav; Dostal, Josef Czech. 158,758 (Cl. C07c), 15 Jul 1975, Appl. 7338-69, 07 Nov 1969; 3 pp. A Fe-Mo-Cr catalyst with high activity and increased mech. strength was prepd. by pptg. sep. aq. solns. of (NH<sub>4</sub>)<sub>2</sub>MoO<sub>4</sub> with a soln. of FeCl<sub>3</sub> and a soln. of CrCl<sub>3</sub>, mixing suspensions of the Fe<sub>2</sub>(MoO<sub>4</sub>)<sub>3</sub> and Cr<sub>2</sub>(MoO<sub>4</sub>)<sub>3</sub> ppts., filtering, drying the cake to 42% moisture content, extruding, cutting to cylinders, drying, and heating 4 hr at 420°. A catalyst contg. 54.5% Mo, 11.7% Fe, and 1.1% Cr had crushing strength 105 kg/cm<sup>2</sup> and produced a 91.3% conversion of MeOH at 300°. L. J. Urbanek

84: 80383z Molybdenum-containing oxidation catalysts. Milberger, Ernest C.; Dolhy, Serge R. (Standard Oil Co. (Ohio)) U.S. 3,928,240 (Cl. 252-467; B01J), 23 Dec 1975, Appl. 177,105, 01 Sep 1971; 5 pp. Hexavalent Mo in aq. soln. or slurry is partially reduced by finely divided metal, org. reducing agent, N<sub>2</sub>H<sub>4</sub> hydrate, Sn<sup>2+</sup>, or SO<sub>2</sub> to a valence state <+6. Catalysts so prepd. are suitable for the oxidn., ammoxidn., and oxidative dehydrogenation of olefins, diolefins, aldehydes, and arom. compds. A. Cedel

84: 80384a Alumina catalyst carriers. Rigge, Ronald J.; Carniglia, Stephen C. (Kaiser Aluminum and Chemical Corp.) U.S. 3,928,236 (Cl. 252-463; B01J), 23 Dec 1975, Appl. 527,093, 25 Nov 1974; 7 pp. Alumina shapes contg. predominantly  $\chi$ - $\rho$ - $\eta$  or pseudoboehmite cryst. phase structures or mixts. thereof are treated with aq. NH<sub>4</sub><sup>+</sup> soln. at pH 5-9. After autoclaving at 100-250 for 4-36 hr, the shapes are leached with H<sub>2</sub>O at ~20-100°. The dried shapes are activated at ~500-980° for 30-100 min. to yield thermally stable catalyst carriers. A. Cedel

84: 80385b Reactivation of a deactivated catalyst. Burton, Vance Paul; Mikulicz, Michael Z. (Universal Oil Products Co.) Ger. Offen. 2,524,223 (Cl. B01J), 11 Dec 1975, US Appl. 475,686, 03 Jun 1974; 12 pp. Highly-dispersed solid catalysts, arranged in a catalyst layer and deactivated by the deposition of polymd. and carbonized hydrocarbon material on the catalyst particles are reactivated by inundating the deactivated catalyst with a reactive liq. (an arom.-contg. hydrocarbon mixt.) at predetd. temp. and pressure; the liq. including the dissolved polymer and carbonized hydrocarbons is removed from the catalyst particles. The catalyst can be regenerated without removal from the reaction zone. Thus, a solid phosphoric acid catalyst for polymn. can be reactivated by treating the catalyst at 40-370° and 1.33-100 atm. with a reactive hydrocarbon mixt.

contg.  $\geq 5\%$  arom. hydrocarbons with b.p. of 40-230°. The catalyst particles are deactivated by a hydrocarbon coating contg. C<sub>2</sub>-C<sub>4</sub> olefins.

84: 80386c Regeneration of a catalyst for hydrofining of petroleum fractions. Eigenson, S. A.; Bobkovskii, E. I.; Gonzalez, M. A.; Manahilin, V. V.; Vail', Yu. K.; Zin'kov, L. M.; Nemets, L. L.; Razumov, I. M.; Kheifets, A. Ya.; et al. U.S.S.R. 494,184 (Cl. B01J), 05 Dec 1975, Appl. 2,021,191, 07 May 1974. From *Otkrytiya, Izobret., Prom. Obrastay, Tovarnye Znaki* 1975, 52(45), 17. For improving the degree of recovery of the activity of the catalyst deactivated by deposits of coke and metals, e.g., V, Na, Fe, the regeneration is carried out by oxidative burning-out of coke with subsequent treatment with a washing soln., a pH 9-10 aq. ammonia soln. satd. with vanadate and/or molybdate anions, drying, and calcining. After sepn. of the suspension of V oxides, the washing soln. is returned for washing of the catalyst.

84: 80387d Catalyst for conversion of ammonia. Sokol'skii, D. V.; Kozin, L. F.; Kuzora, T. V. (Institute of Organic Catalysis and Electrochemistry, Academy of Sciences, Kazakh S.S.R.) U.S.S.R. 494,185 (Cl. B01J), 05 Dec 1975, Appl. 1,969,195, 30 Oct 1973. From *Otkrytiya, Izobret., Prom. Obrastay, Tovarnye Znaki* 1975, 52(45), 17-18. For improving the activity of the catalyst at low temps., it contains 90-97 wt. %  $\gamma$ -Al<sub>2</sub>O<sub>3</sub> as a support and 3-10 wt. % Ru.

84: 80388e Oxidative catalyst. Kadowaki, Yukihige (Mitsubishi Petrochemical Co., Ltd.) Japan. 75 25,914 (Cl. B01J, C07C), 27 Aug 1975, Appl. 70 119,638, 28 Dec 1970; 4 pp. An oxidn. catalyst is described for prepn. of  $\alpha,\beta$ -unsatd. carboxylic acids by oxidn. of  $\alpha,\beta$ -unsatd. aldehydes. The catalyst contains Mo, V, and O with Mo:V 100:(5-70); V oxalate is used (at least in part) as the V source; and the catalyst is sintered at 270-450° in the presence of O. The oxidn. of acrolein with this V oxalate derived Mo-V-O catalyst gave an acrylic acid yield as high as 92 mole %.

84: 80389f Catalyst for carbon monoxide conversion. Furuya, Atsushi (Nissan Guarder Catalyst Co., Ltd.) Japan. 75 31,880 (Cl. B01J, C01B), 15 Oct 1975, Appl. 70 122,555, 30 Dec 1970; 5 pp. A catalyst for CO conversion was prepd. It has the molar ratios CuO:ZnO 1:(0.97-2.91) and MnO:ZnO 1:1-20. Mixts. of sol. Cu and Zn salts are treated with aq. Na<sub>2</sub>CO<sub>3</sub> and then with Mn compds. and aldehydes (reducing agents). The Mn compds. include Mn salts and permanganates.

84: 80390a Filler material from ceramics, for use as catalyst supports. Sauber, Manfred (Rauschert, Paul, K.-G.) Ger. Offen. 2,425,058 (Cl. B01DJ), 04 Dec 1975, Appl. P 24 25 058-6, 24 May 1974; 9 pp. Ceramic tubular bodies which have many axial canals parallel to each other are used as catalyst supports. The sum of the cross section surfaces of the axial canals is 0.3-0.5 the total cross section surface of the filler body. The ceramic materials used can be  $\alpha$ - and  $\gamma$ -Al<sub>2</sub>O<sub>3</sub>, mullite, SiC, TiO<sub>2</sub>, SiO<sub>2</sub>, ZnO, MgO, and/or spinels.

84: 80391a Recovering a cobalt catalyst. Uenaka, Hiroshi; Tomita, Hiroshige; Ohau, Motomasa; Nakanishi, Hirotsugu; Yoshikoshi, Kazuyoshi; Kobayashi, Toshiro (Sumitomo Chemical Co., Ltd.) Japan. 75 25,439 (Cl. B01J, C07C, C01G), 23 Aug 1975, Appl. 70 25,548, 25 Mar 1970; 4 pp. Co catalysts were refined and recovered by removing solid substance from liqs. obtained by oxidizing alkyl benzenes or their derivs. in solvents from C<sub>2</sub>-carboxylic acids. The Co was recovered as Co sulfate by adding aq. H<sub>2</sub>SO<sub>4</sub> to catalyst-contg. liqs. with <20% H<sub>2</sub>O. Approx. 95% of the Co can be recovered. Also Mn, Cr, Fe, and other metals preventing oxidn. can be completely removed. In an example, p-xylene was oxidized to terephthalic acid with formation of a reactor liq. contg. Co 10,000 parts, Fe 81 parts, Ni 37 parts, Cr 44 parts, and Mn 6 parts. H<sub>2</sub>SO<sub>4</sub> (187 g, 10% strength) was added to the reaction liq. contg. 10 g Co at 90° for 30 min to sep. 45 g Co sulfate. Approx. 91% Co was recovered; and 99.9% Fe and Cr, 97.4% Mn, and 8.1% Ni were recovered.

For papers of related interest see also Section:

22 73264h Study of the structural modification of oxide catalysts in the synthesis of organic compounds from carbon monoxide and water by  $\gamma$ -resonance spectroscopy.

73300a Catalytic behavior of partially N-alkylated derivatives of poly(4-vinylpyridine) in the hydrolysis of 3-nitro-4-acetoxybenzoic acid.

73308a Catalytic systems of the disproportionation of linear olefins containing tungsten hexachloride(molybdenum pentachloride) and silacyclobutane compounds.

73319e Catalytic effects of polar molecules and their ability to form hydrogen bonds.

73365a Catalysis by supported transition metal complexes. V. Nature of active centers for palladium resins.

73369w Reaction structure of ethylene hydrogenation on metallic catalysts. 2. Reaction on evaporated nickel film.

73374u The x-ray electron spectra of a modified cobalt-molybdenum catalyst.

73400z Disproportionation of toluene to benzene and xylenes.